REMARKS

Claims 1-14 are pending in the application. By this Amendment claims 3, 5 and 6 are amended. Claims 7-14 are added. Applicants concurrently file herewith a petition and fee for a three-month extension of time.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

With respect to the prior art rejections, claims 1-3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Erdman, et al. (Erdman) (U.S. Patent Application Publication No. 2003/0098660) in view of Hancock, et al. (Hancock) (U.S. Patent No. 5,015,903). Claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Erdman and Hancock, and further in view of Imagi, et al. (Imagi) (U.S. Patent No. 5,650,697). Claim 5 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Erdman and Hancock, and further in view of Chen (U.S. Patent No. 6,589,018). Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Erdman and Hancock, and further in view of Bingler (U.S. Patent Application Publication No. 2003/0209343). Claim 6 also stands rejected under 35 U.S.C. §103(a) as being unpatentable over Erdman and Hancock, and further in view of Faris (U.S. Patent No. 4,206,179).

The rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The invention as recited in independent claim 1, for example, is directed to a fan motor, that includes a single-phase stepping motor including a stator excited by applying an electric current to a coil to function as a single-phase magnetic pole, and a rotor which has a permanent magnet magnetized to a single phase and rotates as the magnetic pole of the stator changes, an impeller which is rotated by a rotating shaft of the rotor, and a drive circuit for controlling an application of a current to the coil. The drive circuit applies pulse voltage to the coil and the coil constant is set so that a mean value of the current applied to the coil is 10 mA or smaller (Application at page 5, lines 4-16).

With this structure, it is possible to drive the impeller to rotate using low current

(Application at page 4, line 24-page 5, line 1).

In a conventional fan motor, as described in the Background of the present Application, use of a stepping motor to drive the impeller at low current was not possible due to the large moment of inertia (Application at page 1, line 12-page 2, line 23). Moreover, use of brushless motors requires a Hall element to detect the rotor position which results in a large current consumption (Application at page 4, lines 1-9)

In contrast, an exemplary aspect of the claimed invention may provide a fan motor including a stepping motor, thereby having an increased useful life while operating a low current consumption and at low noise levels (Application at page 4, line 24-page 5, line 1).

None of the applied references discloses or suggests this invention.

II. THE PRIOR ART REJECTIONS

A. The Erdman and Hancock Reference Rejection

In rejecting claims 1-3 under 35 U.S.C. §103(a) as being unpatentable over Erdman in view of Hancock, the Examiner alleges that the combination renders the subject matter of claims 1-3 obvious.

However, there is no motivation to make the combination as proposed in the Office Action. Moreover, even were such a combination made, the resulting modification of APA would not render the claims obvious.

Applicants submit that the motor disclosed in Erdman corresponds to the brushless motor disclosed in the Background section of the present Application (see Application at page 4, lines 1-9). For example, a brushless motor, as disclosed in Erdman, employs a position detector (e.g., a Hall element) for detecting a position of the rotor. Such a Hall device requires several milliamperes.

In contrast, the present invention suppresses current consumption in part by omitting the use of such a position detector as described in Erdman. Instead, the fan motor of the present invention, is a stepping motor which is structurally different from the motor described in Erdman.

For example, the claimed stepping motor provides an increased driving life and reduced current consumption. Since Erdman teaches a Hall device-type position detector, not a stepping motor as in the invention, Erdman cannot decrease the current consumption.

Moreover, it is admitted in the Office Action that Erdman fails to disclose a stepper

motor and a drive circuit applies pulse voltage to the coil and the coil constant is set so that a mean value of the current applied to the coil is 10 mA or smaller, as recited in independent claim 1.

In an effort to overcome the admitted deficiency, the Examiner combines Hancock for allegedly teaching each of the admittedly deficient features. Specifically, the Examiner alleges that Hancock teaches that "it is well known in the art that an ecm (electronically commutated motor) is commonly used in stepper motor applications." The Examiner relies on column 1, lines 15-36 of Hancock for support of the allegation.

However, the cited section of Hancock recites that, "electronically commutated reluctance motors are designed for efficient power conversion rather than for particular torque control or control characteristics typically required in stepper motor applications."

Thus, Hancock does not teach or suggest that electronically commutated motors are commonly used in stepper motor applications. Instead, Hancock clearly recites that electronically commutated motors are not commonly used in stepper motor applications which require specific torque control. Thus, Hancock actually teaches away from the Examiner's proposed modification of Erdman.

In rejecting claims under 35 U.S.C. §103, it is incumbent on the examiner to establish a factual basis to support the legal conclusion of obviousness. *In re Fine* 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In doing so, the examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 476 (1966), and to provide a reason why one of ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. *Uniroyal Inc. v. F-Wiley Corp.*, 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988).

Moreover, even considering *arguendo*, that such a combination were made, the resulting combination does not disclose or suggest all of the features of the rejected claims.

For example, the combination of references fails to disclose or suggest that "the drive circuit applies pulse voltage to the coil and the coil constant is set so that a mean value of the current applied to the coil is 10 mA or smaller.

The Examiner alleges that this claim feature is merely an optimum value of a "result effective variable" that "involves only routine skill in the art." However, to be a "result effective variable," the particular parameter must first be recognized as a result-effective

variable (i.e., a variable which achieves a recognized result), before the determination of the optimum ranges of said variable might be characterized as routine experimentation (MPEP §2144.05).

As neither Erdman nor Hancock recognizes the coil constant of the drive circuit to be set so that a mean value of the applied current applied to the coil to be a result effective variable, there can be no routine experimentation to derive at the claimed feature.

Thus, the combination of references fails to disclose or suggest the features of the rejected claims and withdrawal of the rejection is respectfully requested.

B. The Erdman, Hancock and Imagi Reference Rejection

In rejecting dependent claim 4 under 35 U.S.C. §103(a) as being unpatentable over the combination of Erdman, Hancock and Imagi, the Examiner alleges that the combination of references discloses all of the elements of the rejected claims. However, claim 4 is allowable for its dependency on independent claim 1, for the reasons discussed above, as well as for the additional features recited therein.

For example, it is alleged that Fig. 41 of Imagi discloses the additional features recited in claim 4. However, Fig. 41 shows the how the rotational speed of a motor varied when the number of ON cycles was changed with the percent energization held at a constant value.

Accordingly, withdrawal of the rejection is respectfully requested.

C. The Erdman, Hancock and Chen Reference Rejection

In rejecting dependent claim 5 under 35 U.S.C. §103(a) as being unpatentable over the combination of Erdman, Hancock and Chen, the Examiner alleges that the combination of references discloses all of the elements of the rejected claims. However, claim 5 is allowable for its dependency on independent claim 1, for the reasons discussed above, as well as for the additional features recited therein.

For example Chen fails to disclose a coupling mechanism which couples the impeller to the rotating shaft relatively and rotatably, wherein the coupling mechanism couples the impeller slidably to the rotating shaft of the rotor, causes the rotating shaft to race with respect to the impeller at the time of starting the motor, and causes the impeller to rotate by following the rotation of the rotating shaft by friction during the steady operation.

Chen discloses an electric fan having a bladed propeller assembly 9 fixed to the shaft

34 of an electric motor (see Fig. 6 of Chen). As shown in Fig. 6, the propeller assembly appears to be fixed to the shaft by a bolt (not numbered). Further, as recited at col. 3, lines 35-40, the female connector is press-fit around the output shaft. Thus, the shaft cannot "race" with respect to the propeller.

Further, to establish a *prima facie* case of obviousness there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Further, the teaching or suggestion to make the claim combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure (MPEP §2143). Determination of whether the combination is appropriate is based on first determining whether the reference is "within the field of the inventor's endeavor." *In re Deminski* 796 F2d 436, 230 USPQ 313 (Fed. Cir. 1986).

Chen seeks to reduce or eliminate the number of assembly steps when assembling an electric fan (col. 1, lines 36-45 of Chen). In contrast, the present invention provides a fan motor having an increased useful life while operating a low current consumption and at low noise levels. As Chen is not within the "field of endeavor" of the present Application, a *prima facie* case of obviousness has not been established.

Accordingly, withdrawal of the rejection is respectfully requested.

D. The Erdman, Hancock and Bingler Reference Rejection

In rejecting dependent claim 6 under 35 U.S.C. §103(a) as being unpatentable over the combination of Erdman, Hancock and Bingler, the Examiner alleges that the combination of references discloses all of the elements of the rejected claims. However, claim 6 is allowable for its dependency on independent claim 1, for the reasons discussed above, as well as for the additional features recited therein.

For example Bingler fails to disclose or suggest a coupling mechanism which couples the impeller to the rotating shaft relatively and rotatably, wherein the coupling mechanism couples the impeller slidably to the rotating shaft of the rotor.

Bingler discloses a motor shaft 8A connected to a cylinder 9A that is magnetically coupled to an impeller 7 (Fig.5, paragraph [0033]). However, in Bingler, the impeller 7 is not slidably coupled to the shaft 8A.

Accordingly, withdrawal of the rejection is respectfully requested.

E. The Erdman, Hancock and Faris Reference Rejection

In rejecting dependent claim 6 under 35 U.S.C. §103(a) as being unpatentable over the combination of Erdman, Hancock and Faris, the Examiner alleges that the combination of references discloses all of the elements of the rejected claims. However, claim 6 is allowable for its dependency on independent claim 1, for the reasons discussed above, as well as for the additional features recited therein.

As discussed above, to establish a *prima facie* case of obviousness there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Further, the teaching or suggestion to make the claim combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure (MPEP §2143). Determination of whether the combination is appropriate is based on first determining whether the reference is "within the field of the inventor's endeavor." *In re Deminski* 796 F2d 436, 230 USPQ 313 (Fed. Cir. 1986).

Faris seeks to provide a new and improved aquarium hood having an enclosure for containing apparatus therein with cleansed water discharge means below the plane of the hood (col. 1, lines 51-55 of Faris). In contrast, the present invention provides a fan motor having an increased useful life while operating a low current consumption and at low noise levels. As Faris is not within the "field of endeavor" of the present Application, a *prima facie* case of obviousness has not been established.

Accordingly, withdrawal of the rejection is respectfully requested.

New claims 7-14 are not disclosed or suggested by the applied references, whether considered alone or in combination.

IV. FORMAL MATTERS AND CONCLUSION

A. Claim Objections

Claims 5 and 6 are objected to for informalities. As the claims are amended in response to the objection, withdrawal of the objection is respectfully requested.

B. Information Disclosure Statement

Applicants respectfully request acknowledgement and consideration of JP 2-100631 and JP 61-11390 submitted in an Information Disclosure Statement on May 3, 2004. As pointed out in the Information Disclosure Statement, these references are discussed in the

Background of the present Application as Patent Documents 1 and 6, respectively. That is, the concise explanation of relevance is satisfied by such description in the Application. Attached hereto is another copy of the PTO-1449 Form for the Examiner to initial.

C. Priority Documents

Applicants respectfully request acknowledgement of receipt of the Priority Document (JP 2003-088602) submitted on May 3, 2004.

D. Conclusion

In view of the foregoing, Applicants submit that claims 1-14, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Date: 2/1/07

Respectfully Submitted,

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